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### (54) SEMICONDUCTOR MEMORY DEVICE

(57)Abstract:

PURPOSE: To obtain an amorphous nonvolatile memory, which has excellent holding characteristics and reproducibility and a large area and large capacitance and cost thereof is low, by using an amorphous silicon carbide film in place of an amorphous silicon nitride film.

CONSTITUTION: An insulating substrate 11, a lower electrode 12, an N<sup>+</sup> type 13, which is hydrogenated previously by amorphous silicon and to which phosphorus is doped to a high degree, and an N type 14 to which phosphorus is doped similarly to a low degree are formed in the order. An silicon oxide film 15 in which amorphous silicon in oxidized through plasma anodizing, etc., a film 16, which consists of a hydrogenated amorphous silicon carbide film and contains carbon by 35atom% or more, and an upper electrode 17 are shaped in the order.

Accordingly, a device having performance, which has not exist as nonvolatile memories, such as, a holding time of ten years or more, a writing time of 0.1\_ sec or less, even fast erasing speed, a large area and large capacitance and low cost is obtained.